

Presented by

Recovered Energy Resources, Inc.

Litter gasification demonstration was conducted under grant funding from Xcel Energy

Objective was to learn the characteristics and applicability of using turkey litter as a renewable fuel resource

Final report will show the potential to produce electrical power in the Minnesota service area of Xcel Energy using turkey litter

Test and Development work conducted by:

Coaltec Energy

Recovered Energy Resources

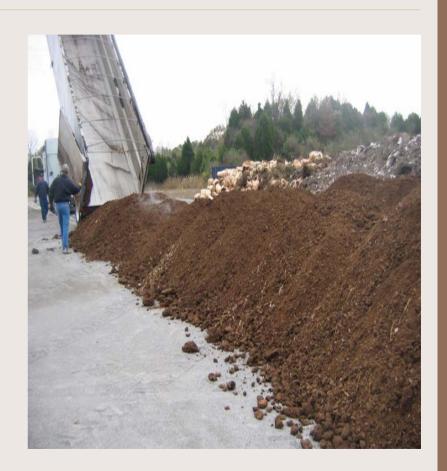
**AURI** 

Southern Illinois University, Carbondale

Turkey Litter Provided by:

Walcott Farms, Allendale Michigan

- Work began with delivery of litter to McVicker Recycling, Marion, Ill
- Two loads, approx. 25 tons each were delivered

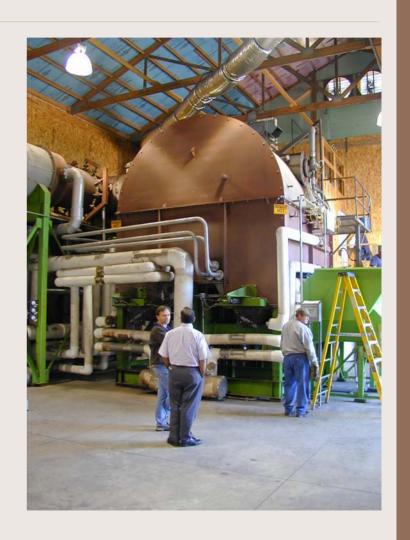


• 12 ton loads of litter transferred to test facility in Carterville

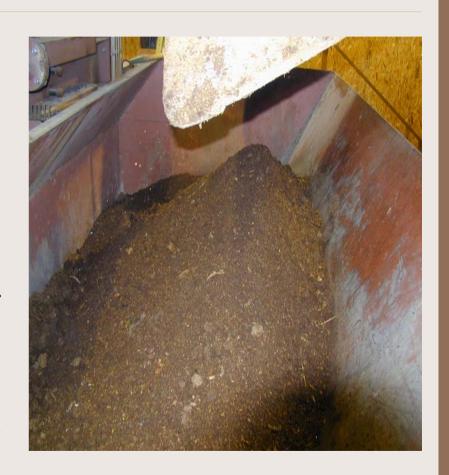


Coaltec Energy
Carterville Illinois
Gasification Test Facility

- Full-scale 25+ million Btu per hour gasifier
- Designed for fuel testing and gasification development



- Gasifier was loaded 1100 lbs. per bucket by front end loader
- Four buckets per hour, or ~2.2 tons per hour fed into the gasifier
- No processing of the litter was done prior to loading
- No significant odor was noted throughout duration of test from either litter pile or plant emissions



- Gasifier fed via a 4 auger system
- Gasifier operated without interruption continuously for 2 days
- Evening turndown was demonstrated
- No supplemental fuel was used once gasification began



#### General Performance

No significant emissions, calcium did produce some visible emission, easily corrected with baghouse

High ash quality with no clinkers

High overall system efficiency



- Emissions Monitored: CO, CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>
  - All emissions very low, posing no commercial problems
  - NO<sub>x</sub> and SO<sub>2</sub> were noted as exceptionally low
  - Some visible calcium emissions, easily controlled
- Ash Quality
  - Consistent fine grain powdery composition
  - High percentage of phosphorus in ash
  - No problems removing from gasifier
  - Potentially saleable material

- Gasifier Thermal Performance
  - Consistent heat production
  - Steady 1,800 Deg. F oxidizer performance
  - Stack temperature ~270 Deg. F
- Thermal throughput
  - 21,000,000 Btu/hr based on Btu value of litter

- Potential Uses of Thermal Energy
  - Steam production for space and process heating
  - Electrical energy generation
  - Heating of grow-out houses
  - Producing chilled water for grow-out house cooling

- Next Steps
  - Completion of Xcel Energy report
  - Evaluation of end-user application
  - Complete plant engineering
  - Construct first turkey litter-to-energy project (MI)
  - Use test data for development of farm scale poultry litter-to-energy system (currently underway in WV)

### Recovered Energy Resources, Inc. P.O. Box 488 Washington, Virginia 22747



540-675-2492

www.recoveredenergyresources.com